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**PATENT SPECIFICATION**



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Complete Accepted: Oct. 22, 1925.

**COMPLETE SPECIFICATION.**

**Improvements in Electric Heaters for Boiling Water and Generating Steam.**

I, ERNEST SHRUBSOLE, a British subject, of 47A, Regent's Park Road, London, N.W. 1, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to electrical heating apparatus for heating water and for generating steam, (for example, for use in utensils such as tea-pots, cafetiers, or like purposes) wherein spaced electrodes are fitted within perforated cylinders or enclosures arranged within the utensil, so that when the electrodes are included in a circuit at a pressure of say 50 to 200 volts the water is heated, the steam or gas pressure ensuing in the cylinder or enclosure being utilised to reduce the contact between the water and electrodes so as to regulate automatically the current flow, and in some instances as in a cafetier to force the heated water into the infusion vessel or chamber.

According to the invention the electric heater comprises spaced electrodes mounted within an inverted cup or small perforated enclosure, one or more of the electrodes being in the form of wire.

When two wire electrodes are used they are preferably mounted on a post of insulating material which is preferably provided with radial spurs to hold the wires in spaced relation.

The post may be utilised to support the inverted cup and it may be formed integrally with or be mounted on a screwed plug so that the whole forms a self-contained device which can be inserted in and removably secured in an orifice in the vessel or utensil to which it is to be applied for instance a steriliser, shaving pot, tea-pot or the like.

When applied to a two-compartment vessel so that the steam pressure set up

on boiling can be utilised to force the water from the boiling compartment into an upper or infusion compartment, a water duct and a gas vent are provided between the two compartments, the gas vent avoiding the ejection of the water before it is thoroughly boiled, it being necessary there be active generation of steam and considerable pressure before the ejection occurs.

In the accompanying drawings:—

Figures 1 and 2 are, respectively, a side sectional elevation and a cross sectional elevation showing one form of the invention as applied to a steriliser.

Figure 3 is a sectional elevation of another form of the invention applied to a shaving pot.

Figure 4 being an underside view of part of the heater, and

Figure 5 being a sectional elevation of a similar form applied to a coffee pot.

Figures 6 and 7 are, respectively, a front sectional elevation and a side elevation illustrating a further form of the invention applied to a tea-pot.

Figure 8 is a sectional elevation illustrating a further form of heater applied to a receptacle for water required for general purposes.

In the form of the invention illustrated by Figures 1 and 2 the heater comprises a platinised gold wire electrode 12 and an electrode 1 in the form of a rod of stainless steel inserted in a plug 13 of electrical insulating material such as porcelain or ebonite composition, and provided with plug terminals 3 for connection to a suitable source of current at say from 50 to 200 volts. The electrodes are enclosed in a small chamber 4 having a small hole 14 for the passage of water, and a perforated screwed cap 6, the perforations permitting a restricted passage of water and or steam or gas.

A removable support 15 for instru-

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ments to be sterilised is placed on the base 2 and covered by a removable glass bell or other cover 11.

When the current is switched on the water in the chamber 4 begins to boil and as soon as steam is generated therein the water level is forced down until steam escapes through the perforation 14. When all the water has been evaporated the current is automatically cut off so no harm is done, if the apparatus be left inadvertently with the current on.

If the steam condenses and the water of condensation flows back through the perforation 14 into the chamber 4, the current flows again and the water is again converted into steam.

In the form shown the platinised gold wire electrode 12 and the rod electrode 1 are carried by a screwed plug 13 of insulating material in which the chamber 4 is formed. The whole heating unit forms a self-contained device adapted to be inserted in and removably secured in a hole in the base or vessel 2.

In the form shown in Figure 3 the electrodes consist of two platinised gold wires 16 and 17, coiled about a post 18 of insulating material mounted on a porcelain or other suitable screwed plug 19 screwed into the bottom of a shaving pot 20. The wire electrodes 16 and 17 are connected to screws 21 and 22. A lead 23 is connected to a screw 22 and a second lead 24 to a screw 25, Figure 4, a fuse wire 26 connecting the screw 25 to the screw 21. The electrodes are enclosed in a chamber 4 formed by a screwed cap 5 having two or more small holes 14 near the base for the passage of water or steam.

The shaving pot 20 has a water boiling compartment 27 and a container 28 for the water boiled. The compartment 27 is provided with a filling nozzle 29 fitted with an air-tight closure 30 such as a screwed cap or as indicated a well known type of flexible grip cover which can be removed by pressure on its centre. A water passage 31 communicates with the compartment 27 near the bottom thereof and with the container 28 near the top thereof. A vent plug 32 having a small bleed hole is provided near the top of both the compartment 27 and the container 28.

When the compartment 27 is partly filled with cold water and the closure 30 applied, current is switched on. As the water is gradually heated the small bleed hole in the vent plug 32 allows air to escape so that the pressure in the container remains normal. When the water is actually boiling and steam is being violently generated the vent 32 is not

sufficient to allow the steam to escape quickly enough to avoid the creation of a pressure above atmospheric and consequently the boiled water is forced up the passage 31 into the container 28. The lower end of the passage 31 may be at a level slightly above the perforations in the cap 5 so as to allow a small quantity of water to remain in the compartment 27 for the generation of steam to keep the water in the container 28 warm for a considerable time.

In the form shown in Figure 5 a similar electric heater to that just described is shown fitted in the bottom of a coffee pot 35 provided with a well known type of infuser comprising a pipe 33 having a perforated bell shaped lower end placed over the cap 5 and its upper end above a perforated or gauze container 34 for coffee. When the water in the pot 35 boils the steam pressure forces the water up the pipe 33 on to the coffee in the container 34.

In the form shown in Figures 6 and 7 a somewhat similar arrangement is adopted for use as a tea-pot 36 to that above described with reference to Figures 3 and 4 corresponding parts being indicated by similar reference numerals. The helically wound platinised gold wire electrodes 16 and 17 are shown mounted on spurs 37 radially mounted on the post 18 so that the wires are held away from the post. The cap 5 is also shown screwed on to the top of the post 18 so that its lower edge may be raised more or less above the screwed plug 19 to allow for the passage of the water and steam. The tea leaves are placed in the upper compartment 28 and the water in the lower compartment 27. When the water actually boils and sufficient steam is generated to set up the necessary pressure the water is forced up the passage 31 on to the tea leaves in the compartment 28. The lower end of the passages 31 may be slightly above the level of the top of the plug 19 so that a small quantity of water remains in the compartment 27 for generation of steam to keep the tea in the upper compartment warm for some time.

In the form shown in Figure 8 a heater is shown which may be applied to any vessel containing water for instance a bottle 38 from which the water when heated may be discharged into other receptacles for general purposes. In the particular form shown the discharge is effected automatically through a pipe or spout 39 which is a continuation of the post 18 on which the wire electrodes 16, 17, are mounted, the post being tubular to provide the water passage 31. An air

vent 32 is also provided. The tubular post 18 is fitted in a screwed plug 19 or other stopper adapted to be fitted in an air tight manner in the mouth of the bottle. The leads from the electrodes 16, 17, are passed up inside the post 18 to screws 21, 22, and thence to a flexible cable as in the previous examples. An adjustable cap 5 is mounted on the post 18 by which the amount of electrode submerged in water may be regulated. The operation is similar to that of the example shown in Figure 6.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An electric heater of the kind referred to, comprising spaced electrodes mounted within an inverted cup or small perforated enclosure, one or more of the electrodes being in the form of wire, substantially as hereinbefore set forth.

2. An electric heater according to Claim 1 wherein the wire electrodes are mounted in spaced relation on a post of insulating material.

3. An electric heater according to Claim 1 or 2 wherein the wire electrodes are mounted in spaced relation on spurs projecting from a post of insulating

material, substantially as hereinbefore set forth.

4. An electric heater according to Claim 1, 2 or 3 wherein the post also supports the inverted cup, substantially as and for the purpose hereinbefore set forth.

5. An electric heater according to Claims 1, 2, 3 or 4, wherein the post and electrodes are carried by a screwed plug so as to form a self-contained device adapted to be inserted in and removably secured in an orifice in the vessel to which it is to be applied.

6. A two compartment utensil having a lower compartment fitted with a heating unit according to Claim 1, 2, 3, 4 or 5, the two compartments being connected by a water duct and a gas vent so that the water is only transferred automatically from the lower compartment to the upper when actually boiling, substantially as hereinbefore set forth.

7. The several forms of utensil fitted with electrical heaters hereinbefore described with reference to the accompanying drawings.

Dated this 4th day of May, 1925.

MATHYS & Co.,  
Chartered Patent Agents,  
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*[This Drawing is a reproduction of the Original on a reduced scale.]*

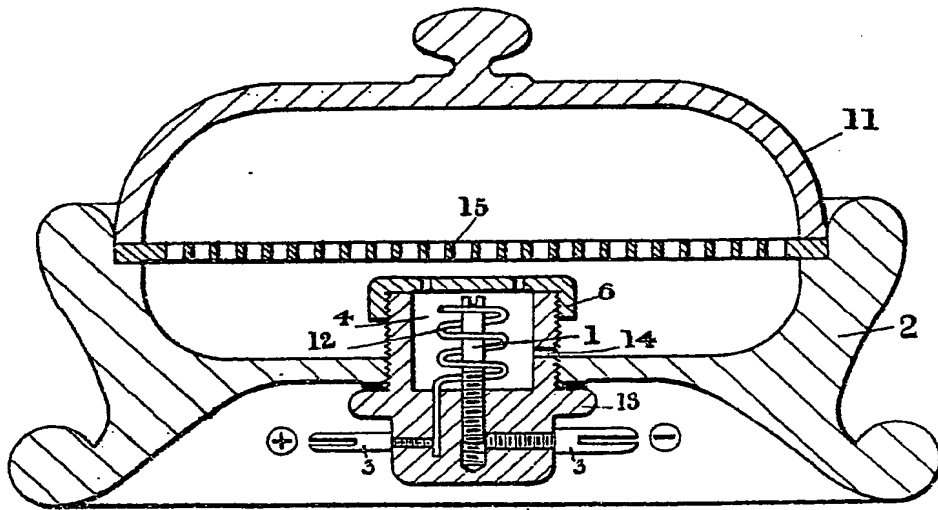


Fig. 1.

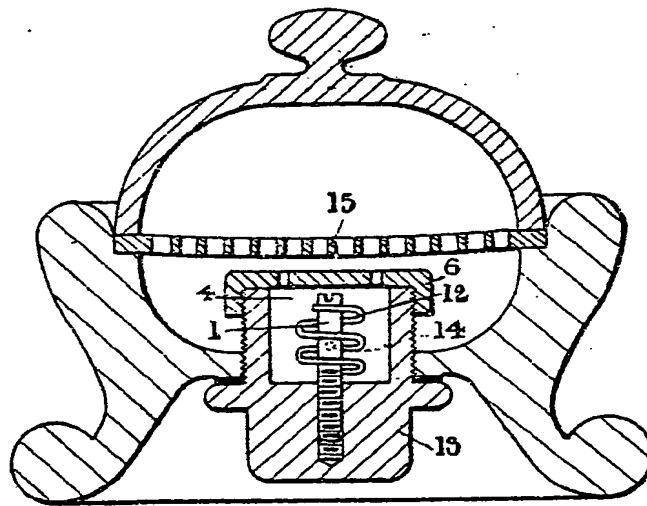


Fig. 2.



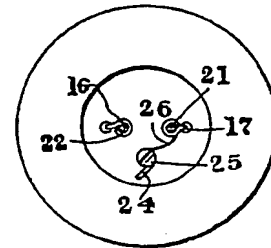
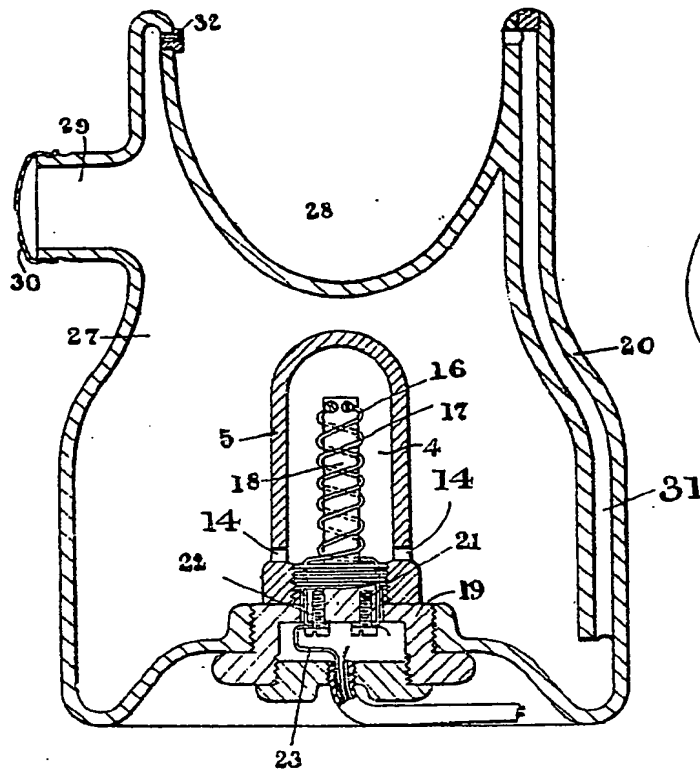


Fig. 4.

Fig. 3.

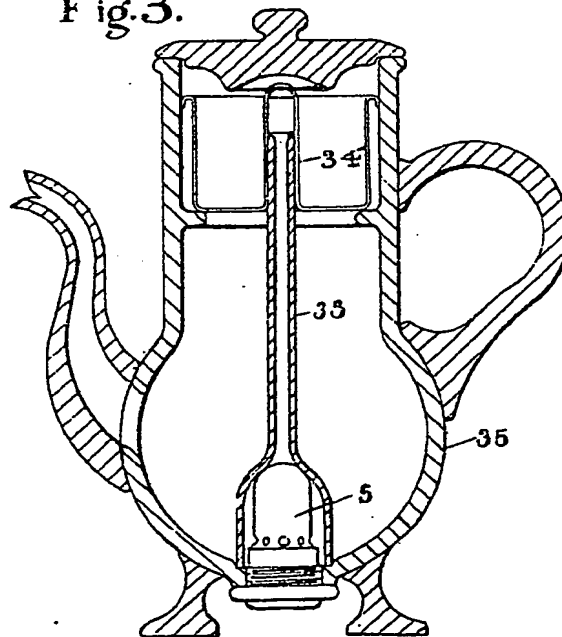


Fig. 5

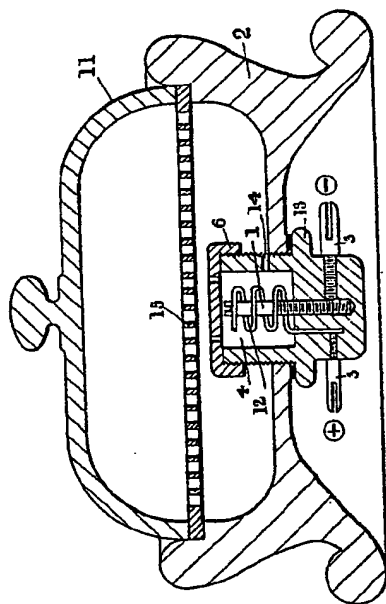


Fig. 1.

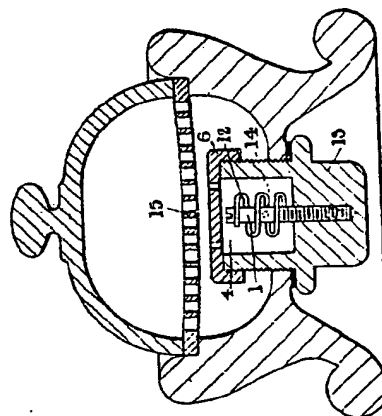


Fig. 2.

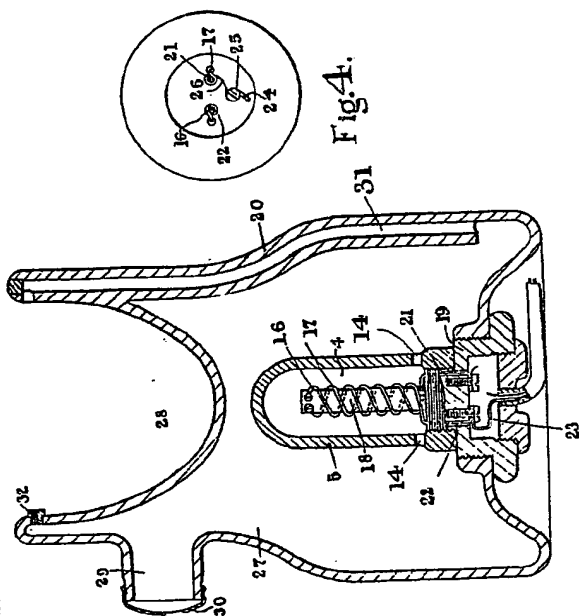


Fig. 3.

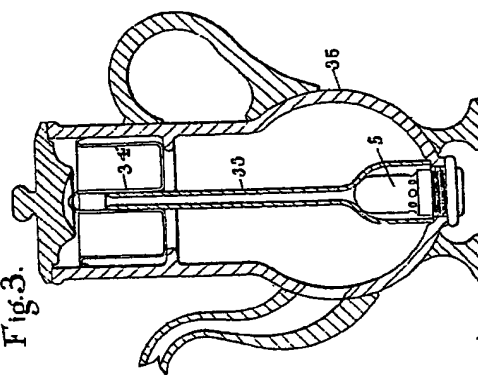


Fig. 4.

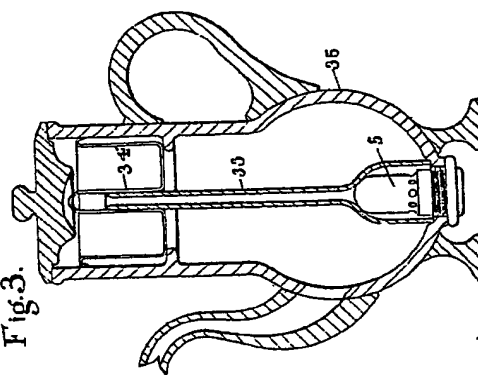
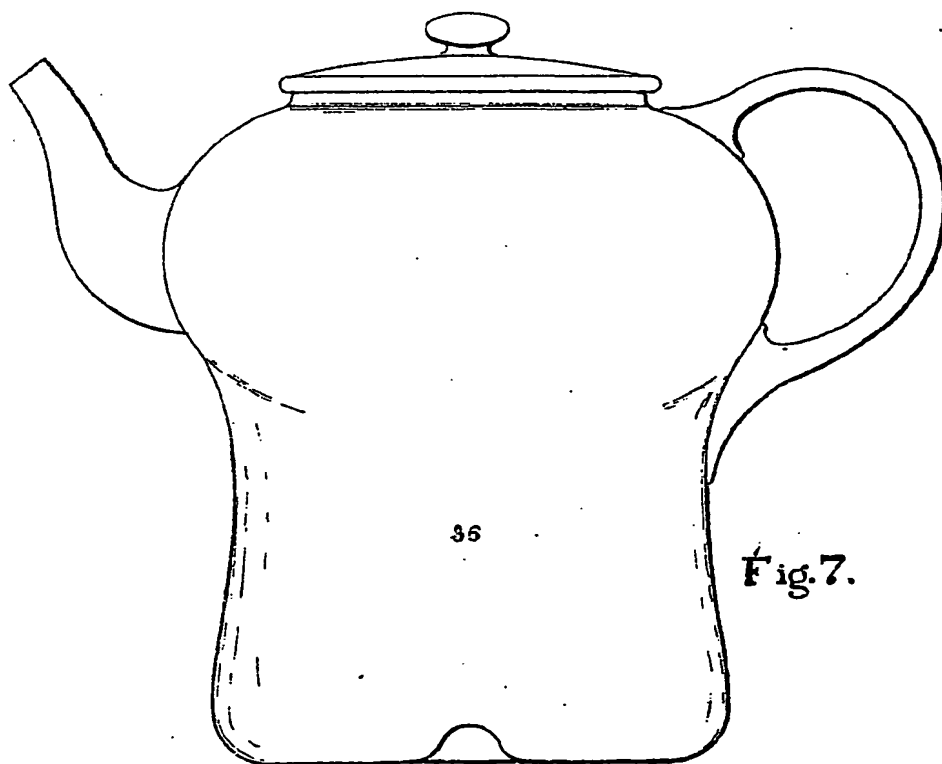
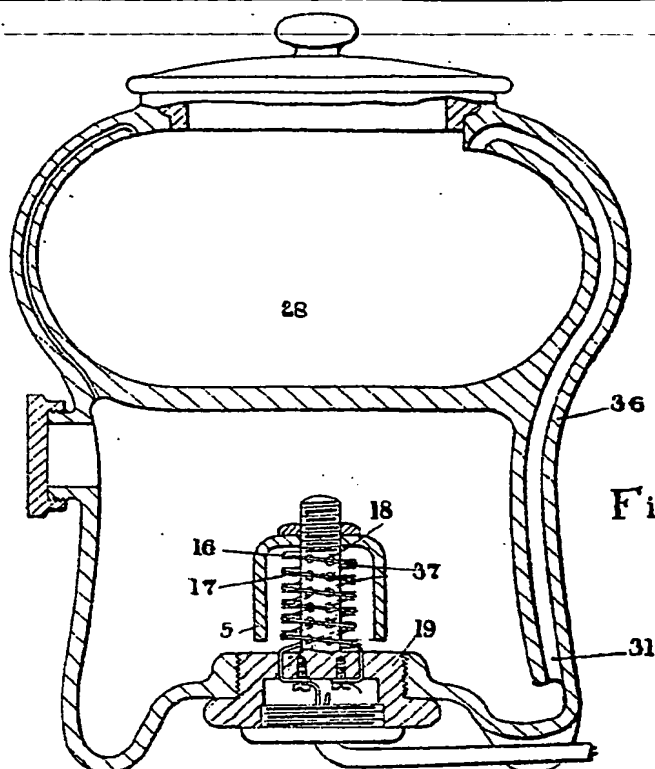


Fig. 5.

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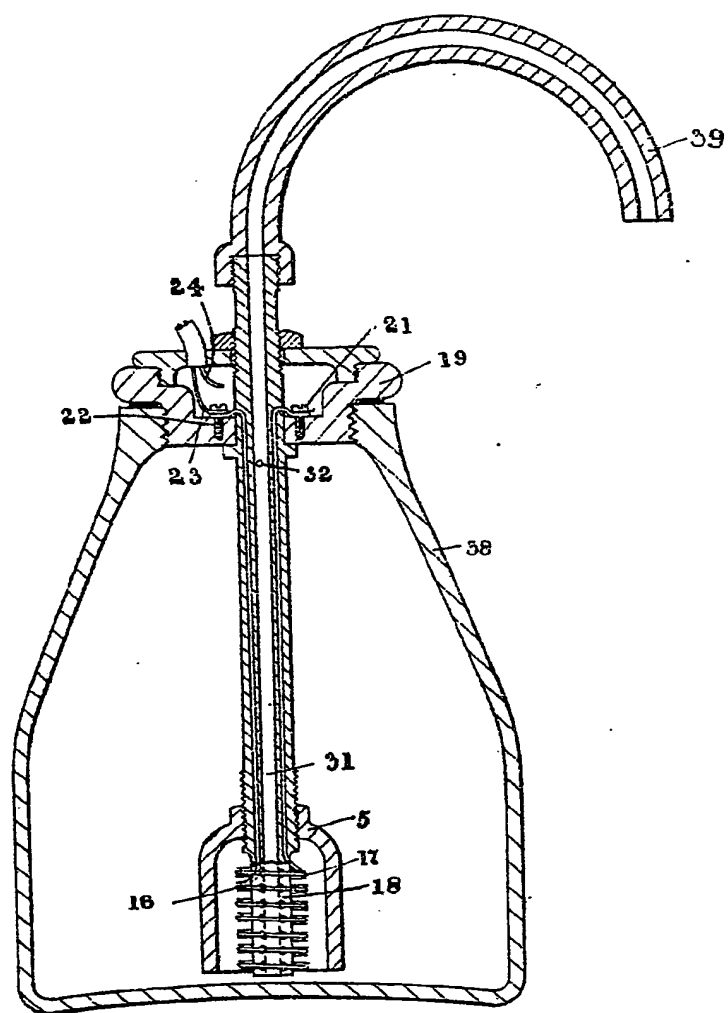
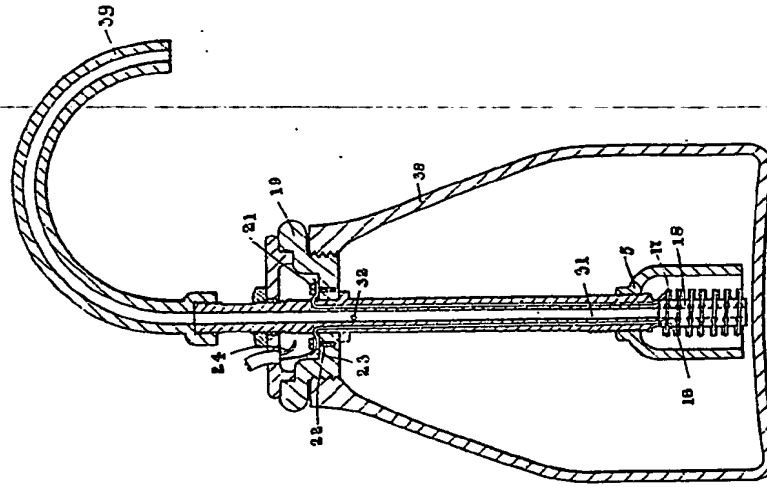
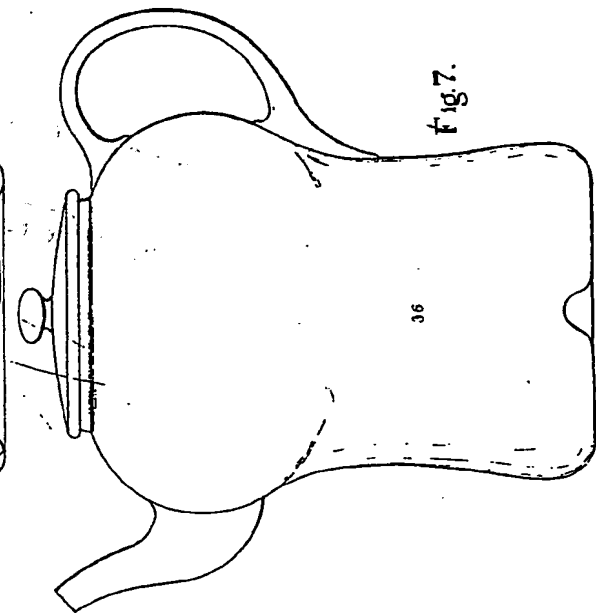
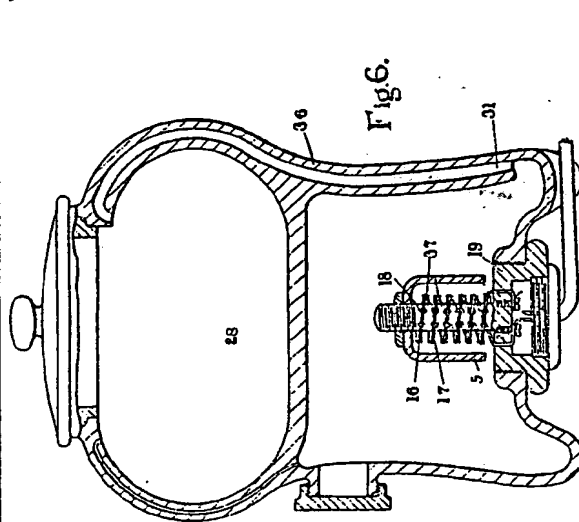


Fig. 8.





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